

FACT SHEET AND SUPPLEMENTAL INFORMATION  
FOR THE PROPOSED REISSUANCE OF  
THE NPDES GENERAL PERMIT FOR NEW AND EXISTING SOURCES  
IN THE OFFSHORE SUBCATEGORY OF  
THE OIL AND GAS EXTRACTION POINT SOURCE CATEGORY FOR  
THE WESTERN PORTION OF THE OUTER CONTINENTAL SHELF OF  
THE GULF OF MEXICO (GMG290000)

June 22, 2004

U.S. Environmental Protection Agency  
Region 6  
1445 Ross Ave.  
Dallas, TX 75202

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**Proposed Reissuance of the NPDES General Permit for New and Existing Sources in the Offshore Subcategory of the Oil and Gas Extraction Point Source Category for the Western Portion of the Outer Continental Shelf of the Gulf of Mexico (GMG290000)**

**AGENCY:** Environmental Protection Agency

**ACTION:** Notice of Proposed NPDES General Permit Issuance

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**SUMMARY:** The Regional Administrator of Region 6 today proposes to reissue the National Pollutant Discharge Elimination System (NPDES) general permit No. GMG290000 for existing source and New Source facilities in the Offshore Subcategory of the Oil and Gas Extraction Point Source Category (40 CFR Part 435, Subpart A), located in and discharging to the Outer Continental Shelf offshore of Louisiana and Texas. The discharge of produced water to that portion of the Outer Continental Shelf from Offshore Subcategory facilities located in the territorial seas of Louisiana and Texas is also authorized by this permit.

The draft permit proposes to retain the limitations and conditions of the expiring permit. The existing permit limitations conform with the Oil and Gas Offshore Subcategory Guidelines and contain additional requirements to assess impacts from the discharge of produced water to the marine environment, as required by Section 403(c) of the Clean Water Act.

The following changes to the expiring permit are proposed as part of the permit reissuance: The time frame is specified for collection of a produced water sample after a sheen is observed. The discharge prohibitions at National Marine Sanctuaries are clarified in an attempt to better reflect National Oceanic and Atmospheric Administration regulations. The variability factor for use in determining compliance with the permit's limits for sediment toxicity and biodegradation is removed. The requirement to submit fourteen day advanced notification of intent to be covered by the permit is removed. The final discharge monitoring report will be required to be submitted along with the notice of termination. New test methods are allowed for monitoring cadmium and mercury in stock barite. Several minor miscellaneous discharges are added to better represent deep water technologies. Other changes to the permit's miscellaneous discharge requirements are proposed to clarify that toxicity testing is not required for non-toxic dyes. Other minor changes in wording are also proposed to resolve confusion of EPA's intent regarding the permit's requirements.

EPA is proposing that the permit be reissued for a three year term. During the permit term, EPA and Minerals Management Service (MMS) is proposing a study to collect additional information to support the evaluation of the potential BOD contribution from produced water discharges in the hypoxic zone in the northern Gulf of Mexico. Our intent is to ensure that we have the information necessary to determine whether or not anticipated future increases in produced water discharges may result in unreasonable degradation of the marine environment. EPA and Minerals Management Service (MMS) will work in partnership to determine the appropriate next steps based on this study.

**ADDRESS:** Comments should be sent to:

Regional Administrator  
U.S. Environmental Protection Agency  
Region 6  
1445 Ross Avenue  
Dallas, Texas 75202-2733.

**DATE:** Comments must be received by [ 30 days after publication ].

**FOR FURTHER INFORMATION CONTACT:** Ms. Diane Smith, U.S. Environmental Protection Agency, Region 6, 1445 Ross Avenue, Dallas, Texas 75202-2733. Telephone: (214) 655-7191. The complete proposed permit, Fact Sheet and a copy of the Federal Register notice may also be obtained on the Internet at: <http://www.epa.gov/earth1r6/6wq/6wq.htm>

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### I. Legal Basis

Section 301(a) of the Clean Water Act (CWA or the Act), 33 USC 1311(a), renders it unlawful to discharge pollutants to waters of the United States in the absence of authorizing permits. CWA section 402, 33 USC 1342, authorizes EPA to issue NPDES permits allowing discharges on condition they will meet certain requirements, including CWA sections 301, 304, 306, 401 and 403. Those statutory provisions require NPDES permits include effluent limitations for authorized discharges: (1) meet standards reflecting levels of technological capability; (2) comply with EPA-approved state water quality standards; (3) comply with other state requirements adopted under authority retained by states under CWA section 510, 33 USC 1370; and, (4) cause no unreasonable degradation to the territorial seas, waters of the contiguous zone or the oceans.

CWA section 301 requires compliance with BCT and BAT no later than March 31, 1989. CWA section 306 requires compliance with New Source Performance Standards (NSPS) no later than the effective date of such standards. Accordingly, three types of technology-based effluent limitations are included in the proposed permit. With regard to conventional pollutants, i.e., pH, BOD, oil and grease, TSS, and fecal coliform, CWA section 301(b)(1)(E) requires effluent limitations based on "best conventional pollution control technology" (BCT). With regard to nonconventional and toxic pollutants, CWA sections 301(b)(2)(A), (C) and (D) require effluent limitations based on "best available pollution control technology economically achievable" (BAT). For New Sources, CWA section 306 requires effluent limitations based on NSPS. Final effluent guidelines specifying BCT, BAT and NSPS for the Offshore Subcategory of the Oil and Gas Point Source Category (40 CFR 435, Subpart A) were issued January 15, 1993, and were published at 58 FR 12454 on March 4, 1993. Those guidelines were modified on January 22, 2001 (see 66 FR 6850, January 22, 2001), to issue technology based treatment standards for discharges associated with the industry's use of synthetic based drilling fluids.

### II. Ocean Discharge Criteria Evaluation.

For discharges into waters of the territorial sea, contiguous zone, or oceans, CWA section 403 requires EPA to consider guidelines for determining potential degradation of the marine environment when issuing NPDES permits. These Ocean Discharge Criteria (40 CFR 125, Subpart M) are intended to "prevent unreasonable degradation of the marine environment and to authorize imposition of effluent limitations, including a prohibition of discharge, if necessary, to ensure this goal" (see 45 FR 65942, October 3, 1980). EPA Region 6 has previously determined

that discharges in compliance with the Western Gulf of Mexico Outer Continental Shelf general permit (GMG290000) will not cause unreasonable degradation of the marine environment. Since this proposed permit contains limitations which will protect water quality and in general reduce the discharge of toxic pollutants to the marine environment, the Region finds that discharges proposed to be authorized by the reissued general permit will not cause unreasonable degradation of the marine environment.

When the permit was previously reissued in 1992 (see 57 FR 54642, November 19, 1992), EPA determined that the authorized discharges were consistent with the requirements of Ocean Discharge Criteria and that issuance of the permit would not result in any unreasonable degradation of the marine environment. EPA again made that determination when the permit was reissued in 1999 (see 64 FR 19156, April 19, 1999). Most recently, EPA modified the general permit in 2001 (see 66 FR 65209, December 18, 2001). As a part of the issuance of that modification, EPA determined that discharges authorized by the permit would not result in unreasonable degradation of the marine environment.

This proposed permit contains numerous limitations and monitoring requirements intended to protect water quality and ensure compliance with Ocean Discharge Criteria. Whole effluent toxicity limits have been placed on many of the authorized discharges to prevent toxic impacts to the marine environment. Numerous other requirements, such as discharge rate limitations, are contained in this proposed permit to prevent impacts to the marine environment.

With this reissuance, EPA proposes many permit conditions that are more stringent than the previous permit and again EPA has determined that the authorized discharges will not result in unreasonable degradation to the marine environment. This action is, therefore, consistent with the requirements of CWA section 403(c).

EPA, in coordination with MMS, is proposing to conduct a study to collect additional information to support an evaluation of the potential BOD contribution from produced water discharges in the hypoxic zone located in the northern Gulf of Mexico. Our intent is to ensure that we have the information necessary to determine whether or not anticipated future increases in produced water discharges may result in unreasonable degradation of the marine environment under Clean Water Act Section 403(c). The agencies expect to work closely with the oil and gas industry to conduct this study during the next three years.

### **III. Regulatory Background**

On April 3, 1981 (see 46 FR 20284), EPA published three final general NPDES permits authorizing discharges from facilities in the Offshore Subcategory of the Oil and gas Extraction Point Source Category located offshore of Louisiana and Texas. Two of those permits, TX0085651 and LA0060224, authorized discharges from facilities located in the territorial seas off Louisiana and Texas. The third permit, TX0085642, authorized discharges from facilities located seaward of the outer boundary of the territorial seas off Louisiana and Texas, an area commonly known as the Outer Continental Shelf. The Outer Continental Shelf General Permit

did not include several facilities located near the Flower Garden Banks, an area with sensitive biological features approximately 120 miles southeast of Galveston, Texas. Twelve facilities in the vicinity of the Flower Garden Banks were authorized to discharge under individual permits. The 1981 general permits implemented "Best Practicable Control Technology Currently Available" (BPT) guidelines for the Offshore Subcategory (see 40 CFR 435). Those permits contained a daily maximum oil and grease limit of 72 mg/l for produced water discharges, a prohibition of the discharge of oil based drilling fluids, a limit of no free oil for drilling fluids, drill cuttings, deck drainage and well treatment fluids, and 1 mg/l residual chlorine for sanitary waste water.

The permits expired April 3, 1983 and were reissued on September 15, 1983 (48 FR 41494) with an expiration date of June 30, 1984. The permits were issued for a short period of time because promulgation of National Effluent Limitations Guidelines for Best Available Technology Economically Achievable were expected by 1983 and again by 1984. The limitations contained in the permits were unchanged in the 1984 reissuance, however, some changes were made for facilities located near the Flower Garden Banks. Lease blocks: North Padre Island 962 and Garden Banks 113 through 132, previously excluded from the permit, were authorized to discharge. High Island South block A392 was excluded from the permit due to its potential effects on the Flower Garden Banks ecosystem. The Louisiana Territorial Seas General Permit was reissued on November 7, 1997 (62 FR 59687) and renumbered as LAG260000. The Texas Territorial Seas General Permit is presently in the process of being reissued as TXG260000.

The Outer Continental Shelf General Permit was reissued on July 9, 1986 (51 FR 24897). In that action EPA Region 6 issued a joint permit with Region 4 authorizing discharges from facilities located in the Outer Continental Shelf throughout the Gulf of Mexico. The permit, numbered GMG280000, prohibited discharge of oil based drilling fluids, oil contaminated drilling fluids, drilling fluids containing diesel oil, and drill cuttings generated using oil based drilling fluids. New limits were included in the permit for suspended particulate phase toxicity in drilling fluids, the drilling fluid discharge rate near areas of biological concern, and for free oil in drilling fluids and drill cuttings. That general permit expired on July 1, 1991.

On November 19, 1992, EPA Region 6 reissued the NPDES general permit for the Western Gulf of Mexico Outer Continental Shelf (57 FR 54642) covering operators of lease blocks in the Offshore Subcategory of the Oil and gas Extraction Point Source Category located seaward of the outer boundary of the territorial seas of Texas and Louisiana. As a part of that reissuance, new limits for produced water toxicity were added, as well as new limits for cadmium and mercury in stock barite, and a prohibition on the discharge of drilling fluids to which mineral oil has been added. That general permit was modified on December 3, 1993, to implement Offshore subcategory effluent limitations guidelines promulgated March 4, 1993 (58 FR 12504) and to include more accurate calculations of produced water critical dilutions. A general permit covering New Sources in that same area of coverage was issued and combined with the Western Gulf of Mexico Outer Continental Shelf general permit on August 9, 1996 (61 FR 41609). The permit expired on November 19, 1997 and was reissued in two parts on November 2, 1998 (63

FR 58722), and April 19, 1999 (64 FR 19156).

In the 1998 reissuance, EPA Region 6 authorized new discharges of seawater and freshwater to which treatment chemicals, such as biocides and corrosion inhibitors, have been added. The maximum discharge rate limit for produced water was removed and the critical dilutions required to be met for the produced water toxicity limit were updated based on the new discharge rates and more current models. To account for advances in drilling fluid technology, the permit was modified on December 18, 2001 (66 FR 65209) to authorize discharges associated with the use of synthetic based drilling fluids. Additional monitoring requirements were also included at that time to address hydrostatic testing of existing piping and pipelines and those discharges were authorized. That permit expired on November 3, 2003 and is being proposed to be reissued at this time. The expired permit is presently administratively continued and covers those operators who submitted a notice of intent prior to its expiration.

#### **IV. Facility Coverage**

The general permit covers existing source facilities and new source facilities in the offshore subcategory of the oil and gas extraction point source category located in and discharging to lease blocks in the Outer Continental Shelf of the Western Gulf of Mexico. The permit also authorizes discharges to the Outer Continental Shelf of the Western Gulf of Mexico from facilities located in the territorial seas offshore of Louisiana and Texas. Operators with platforms located near the boundary of the territorial seas are allowed to transfer waste water from a platform within the territorial seas to a platform located in the Outer Continental Shelf where wastewater will be treated and discharged. This does not, however, include drilling fluids or drill cuttings from facilities where the wellhead is located in the territorial seas. Those discharges are prohibited in the territorial seas based on Offshore Subcategory effluent limitations guidelines, and thus are not authorized to be transferred to the Outer Continental Shelf and discharged.

#### **V. Types of Discharges Covered**

The discharges proposed to be authorized by the reissued permit are listed below. Changes from the previous permit generally include minor clarifications for existing discharges. The definitions of the waste streams are the same as those given in the Offshore Subcategory guidelines (40 CFR 435, Subpart A) except for miscellaneous discharges which were not covered by those guidelines. The waste streams specifically are:

**A. Drilling fluids** - the circulating fluid (mud) used in the rotary drilling of wells to clean and condition the hole and to counterbalance formation pressure. Classes of drilling fluids are:

- (a) “Water-Based Drilling Fluid” means the continuous phase and suspending medium for solids is a water-miscible fluid, regardless of the presence of oil.



(b) “Non-Aqueous Drilling Fluid” means the continuous phase and suspending medium for solids is a water-immiscible fluid, such as oleaginous materials (*e.g.*, mineral oil, enhanced mineral oil, paraffinic oil,  $C_{16}$ - $C_{18}$  internal olefins, and  $C_8$ - $C_{16}$  fatty acid/2-ethylhexyl esters).

(i) “Oil-Based” means the continuous phase of the drilling fluid consists of diesel oil, mineral oil, or some other oil, but contains no synthetic material or enhanced mineral oil.

(ii) “Enhanced Mineral Oil-Based” means the continuous phase of the drilling fluid is enhanced mineral oil.

(iii) “Synthetic-Based” means the continuous phase of the drilling fluid is a synthetic material or a combination of synthetic materials.

**B. Drill cuttings** - the particles generated by drilling into subsurface geologic formations including cured cement carried out from the wellbore with the drilling fluid. Examples of drill cuttings include small pieces of rock varying in size and texture from fine silt to gravel. Drill cuttings are generally generated from solids control equipment and settle out and accumulate in quiescent areas in the solids control equipment or other equipment processing drilling fluid (*i.e.*, accumulated solids).

(a) “Wet Drill Cuttings” means the unaltered drill cuttings and adhering drilling fluid and formation oil carried out from the wellbore with the drilling fluid.

(b) “Dry Drill Cuttings” means the residue remaining in the retort vessel after completing the retort procedure specified in Appendix 7 of 40 CFR 435, Subpart A.

**C. Deck drainage** - any waste resulting from deck washings, spillage, rainwater, and runoff from gutters and drains including drip pans and work areas within facilities subject to this permit.

**D. Produced water** - the water (brine) brought up from the hydrocarbon-bearing strata during the extraction of oil and gas, and can include formation water, injection water, and any chemicals added downhole or during the oil/water separation process.

**E. Produced sand** - slurried particles used in hydraulic fracturing, the accumulated formation sands, and scale particles generated during production. Produced sand also includes desander discharge from produced water waste stream and blowdown of water phase from the produced water treating system.

**F. Well treatment, completion fluids and workover fluids** - well treatment fluids are

any fluids used to restore or improve productivity by chemically or physically altering hydrocarbon-bearing strata after a well has been drilled, well completion fluids are salt solutions, weighted brines, polymers, and various additives used to prevent damage to the well bore during operations which prepare the drilled well for hydrocarbon production, and workover fluids are salt solutions, weighted brines, polymers, or other specialty additives used in a producing well to allow for maintenance, repair or abandonment procedures.

**G. Sanitary waste** - human body waste discharged from toilets and urinals.

**H. Domestic waste** - material discharged from galleys, sinks, showers, safety showers, eye wash stations, hand washing stations, fish cleaning stations, and laundries.

**I. Miscellaneous discharges** -

**desalinization unit discharge** - wastewater associated with the process of creating freshwater from seawater.

**blowout preventer control fluid** - fluid used to actuate the hydraulic equipment on the blow-out preventer.

**uncontaminated ballast/bilge water** - seawater added or removed to maintain proper draft.

**uncontaminated freshwater** - freshwater which is discharged without the addition of chemicals; included are: (1) discharges of excess freshwater that permit the continuous operation of fire control and utility lift pumps; (2) excess freshwater from pressure maintenance and secondary recovery projects;

(3) water used during training and testing of personnel in fire protection; and (4) water used to pressure test new piping.

**mud, cuttings and cement at the sea floor** - discharges that occur at the seafloor prior to installation of the marine riser and during marine riser disconnect, well abandonment and plugging operations.

**uncontaminated seawater** - seawater which is returned to the sea without the addition of chemicals. Included are: (1) discharges of excess seawater which permit the continuous operation of fire control and utility lift pumps; (2) excess seawater from pressure maintenance and secondary recovery projects; (3) water released during the training and testing of personnel in fire protection; (4) seawater used to pressure test piping; and (5) once through noncontact cooling water which has not been treated with biocides.

**boiler blowdown** - discharges from boilers necessary to minimize solids build-up in the boilers, including vents from boilers and other heating systems.

**source water and source sand** - water from non-hydrocarbon bearing formations for the purpose of pressure maintenance or secondary recovery including the entrained solids.

**diatomaceous earth filter media** - filter media used to filter seawater or other authorized completion fluids and subsequently washed from the filter.

**excess cement slurry** - the excess mixed cement, including additives and wastes from equipment washdown, after a cementing operation.

**Subsea production discharges** - include: subsea wellhead preservation fluids, subsea production

control fluid, umbilical steel tube storage fluid, leak tracer fluid, and riser tensioner fluids

**J. Chemically Treated Seawater and Freshwater** - seawater or freshwater to which corrosion inhibitors, scale inhibitors, and/or biocides have been added and includes the following discharges:

1. Excess seawater which permits the continuous operation of fire control and utility lift pumps;
2. Excess seawater from pressure maintenance and secondary recovery projects;
3. Water released during training of personnel in fire protection;
4. Seawater used to pressure test piping and pipelines;
5. Ballast water; and,
6. Non-contact cooling water

## **VI. Specific Permit Conditions**

Conditions in the proposed permit are based on: (A) NSPS for New Source facilities; (B) BCT to control conventional pollutants; (C) BAT to control toxic and nonconventional pollutants; and (D) Ocean Discharge Criteria (CWA section 403(c)). Discussions of the rationale for the specific effluent limitations for each regulated waste stream appear below.

### **A. Drilling Fluids**

The limitations in the expiring permit are based on a combination of National Effluent Limitations Guidelines and Ocean Discharge Criteria. The previous permit's limitations are proposed to be included in the reissued permit without any changes.

#### **1. NSPS, BAT, and BCT**

Offshore subcategory guidelines for NSPS (40 CFR 435.15) and BAT (40 CFR 435.13) for drilling fluids discharges from facilities located farther than 3 nautical miles from shore (from the inner boundary of the territorial seas), require no discharge of free oil, no discharge of diesel oil, and a minimum toxicity limit of 3% by volume. In addition, the effluent limitations guidelines prohibit the discharge of non-aqueous based drilling fluids except those adhering to drill cuttings and some small volume discharges. Free oil, for drilling fluids discharges, is measured using the static sheen test method. Toxicity is measured with a 96 hour LC50 on the suspended particulate phase using the *Mysidopsis bahia* species. Based on the guidelines, cadmium and mercury in stock barite used in drilling fluids are limited to 3 mg/kg dry weight and 1 mg/kg dry weight, respectively.

In addition to those effluent limitations guidelines based limits, the reissued permit is proposed to retain the prohibitions of the discharge of oil-based drilling fluids, inverse emulsion drilling fluids, oil contaminated drilling fluids, and drilling fluids to which mineral oil has been added. These prohibitions were included in the permit to ensure compliance with the no discharge of free oil BAT and NSPS limitations. An exception to those prohibitions is allowed in the

expiring permit for drilling fluids to which mineral oil or non-aqueous based fluids have been added as a carrier agent, lubricity additive, or pill.

## 2. Requirements Based on Ocean Discharge Criteria (CWA section 403(c))

The expiring permit contains discharge rate limitations for drilling fluids which ensure discharged drilling fluids are sufficiently dispersed to prevent unreasonable degradation of the marine environment. Those limitations are proposed to remain in the reissued permit.

### **B. Drill Cuttings**

#### 1. All Drill Cuttings

The main source of pollutants in discharged drill cuttings is generally from the drilling fluids which were used in the well. Therefore, based on BAT, BCT, and NSPS, drill cuttings which are authorized for discharge by the general permit must all meet the same limitations and prohibitions as drilling fluids. The discharge of drill cuttings generated using drilling fluids which are oil contaminated or contain diesel oil or mineral oil is prohibited. Cadmium and mercury, as measured in barite used in the drilling fluid, is limited to 3 mg/kg and 1 mg/kg, respectively. Also, the toxicity of the suspended particulate phase of the drilling fluids is limited to 30,000 ppm. Drill cuttings discharges are limited to no free oil, as measured using the static sheen test. These limitations are included in the expiring permit and are not proposed to be revised in the reissued permit.

#### 2. Drill Cuttings Generated Using Non-Aqueous Based Drilling Fluids

The expiring permit was modified on December 18, 2001 (66 FR 65209), to authorize the discharge of drill cuttings generated by use of non-aqueous based drilling fluids. The limitations included in the permit were based on the Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards for the Oil and Gas Extraction Point Source Category, which was published in the Federal Register on January 22, 2001 (see 66 FR 6850). The new limits were included in the permit for both the stock base fluids and those drilling fluids which adhere to discharged drill cuttings. Limitations on the stock base fluid include polynuclear aromatic hydrocarbons (PAH), sediment toxicity (10-day), and biodegradation rate. Prior to its use, the drilling fluid is also limited for formation oil contamination, measured using Gas Chromatography/Mass Spectrometry (GC/MS). Drilling fluids which adhere to drill cuttings and are discharged are limited sediment toxicity (4-day), formation oil contamination as measured by either a reverse phase extraction test or GC/MS, and base fluids which are retained on discharged drill cuttings. No changes to those limits are proposed; however, the variability factors for use in calculating compliance with the limits for sediment toxicity and biodegradation limits are proposed to be eliminated.

### **C. Produced Water**

#### 1. NSPS and BAT

The Offshore Subcategory guidelines for NSPS (40 CFR 435.15) and BAT (40 CFR 435.13) require Oil and Grease limits of 29 mg/l, monthly average, and 42 mg/l, daily maximum.

Those limitations are contained in the expiring permit and are included in the proposed permit.

## **2. Ocean Discharge Criteria (CWA Section 403(c))**

Limits for whole effluent toxicity are contained in the expiring permit based on Ocean Discharge Criteria (CWA section 403(c)). No changes to those limits are proposed as a part of this reissuance. The dispersion modeling used to develop the toxicity limits was examined at length during the last permit reissuance and is deemed appropriate.

### **D. Produced Sand**

#### **1. NSPS, BAT and BCT**

The expiring permit prohibited the discharge of produced sand based on NSPS, BAT, and BCT, established by the Offshore Subcategory Effluent Limitations Guidelines. That prohibition is not proposed to be change.

### **E. Well Treatment, Completion and Workover Fluids**

#### **1. NSPS, BAT, and BCT**

The Offshore Subcategory guidelines for NSPS and BAT require Oil and Grease limits of 29 mg/l, monthly average, and 42 mg/l, daily maximum, for well treatment, completion and workover fluids. A limit of no free oil was also established by the guidelines based on BCT. Those limits were contained in the expiring permit and are not proposed to be changed.

#### **2. Ocean Discharge Criteria (CWA section 403(c))**

Discharged well treatment, completion, and workover fluids are proposed to be limited to no free oil as measured using the static sheen test method and no priority pollutants except in trace amounts. If materials added downhole as well treatment, completion, and workover fluids do not contain priority pollutants then the discharge is assumed to contain nonpriority pollutants, except in trace amounts. The no free oil limit will help prevent the discharge of toxic pollutants contained in oil, which may contaminate these fluids and cause unreasonable degradation of the marine environment. The limit of no priority pollutants except in trace amounts will help prevent the discharge of fluids containing toxic pollutants which have the potential to cause unreasonable degradation of the marine environment. Both of these limits were included in the expiring permit based on Ocean Discharge Criteria under CWA section 403(c).

### **F. Deck Drainage**

#### **1. NSPS, BAT and BCT**

The expiring permit's limits are based on the Offshore Subcategory NSPS, BAT and BCT guidelines which all require No Discharge of Free Oil as determined by the presence of a film or sheen upon, or a discoloration of, the surface of the receiving water (visual sheen). No changes to those limits are proposed.

### **G. Sanitary Waste**

### 1. NSPS and BCT

For sanitary waste, the Offshore Subcategory NSPS and BCT guidelines require residual chlorine be maintained as close to 1 mg/l as possible for offshore facilities continuously manned by ten or more persons. Also, the NSPS and BCT guidelines require No Discharge of floating solids for offshore facilities continuously manned by nine or fewer persons or intermittently manned by any number of persons. The expiring and proposed permits contain limits for sanitary wastewater which are based on those guidelines.

## **H. Domestic Waste**

### 1. NSPS, BAT and BCT

The expiring and proposed permits' limits for domestic waste are based on the Offshore Subcategory NSPS, BAT and BCT established by the Effluent Limitations Guidelines. The guidelines require no floating solids or foam and require compliance with the requirements of 33 CFR 151.

## **I. Miscellaneous Discharges**

### 1. BCT

The expiring permit's requirements of No Free Oil as monitored by the Visual Sheen Test and no floating solids or foam are based on BCT using BPJ and are proposed to be continued in the reissued permit. These miscellaneous discharges are not addressed in the Offshore Subcategory guidelines. In addition, the miscellaneous discharges of chemically treated sea water and fresh water are limited for the concentration of treatment chemicals used based on BAT using BPJ and for whole effluent toxicity based on 403(c).

## **J. All Discharges**

For all permitted discharges, the expiring permit requires No Discharge of halogenated phenols based on CWA section 403(c), No Discharge of rubbish, trash and other refuse based on MARPOL, No Discharge in areas of biological concern based on CWA section 403(c) and the minimization of discharge of surfactants, dispersants and detergents based on CWA section 403(c). These requirements are not proposed to be changed.

## **VII. Produced Water Study for the Northern Gulf of Mexico**

### **A. Causes and Effects of the Northern Gulf of Mexico Hypoxia**

The hypoxic zone of the Gulf of Mexico has long been degraded due to low concentrations of dissolved oxygen. Hypoxic conditions are believed to be caused mainly by high concentrations of nutrients in the Mississippi River's discharge into the Gulf of Mexico. The hypoxic zone has been found to be generally increasing in size and has covered an area of up to 18,000 km<sup>2</sup>, extending westward from the Mississippi River delta and at times reaching waters offshore of

Texas. The Mississippi River's high nutrient load into the Gulf is contained in the upper, less saline, portion of the water column. The total nutrient loading is approximately 1,567,900 metric tons of total nitrogen per year (CENR, 2000). As a result of that nutrient enrichment, a highly elevated level of biological productivity occurs in the upper water column. Carbonaceous matter settles from that highly productive upper layer and, through the process of decaying, consumes the available dissolved oxygen in the lower water column, resulting in the hypoxia. During the last century, accumulation of organic carbon in the Northern Gulf of Mexico has increased from approximately 2 mg per square centimeter per year to nearly 10 mg per square centimeter per year. The hypoxic waters occur from shallow (4 to 5 meters) near shore waters to deeper waters (up to 60 meters) and typically encompass the lower one half to two thirds of the water column (CENR, 2000).

The consequences of hypoxia are not fully known. However, the shallow continental shelf area in the Gulf of Mexico that is affected by hypoxia shows signs of hypoxia-related stress; i.e., low abundance of fish and shrimp and distinctly different benthic communities. While current ecological conditions are a response to a variety of stressors, the most obvious effects of hypoxia are that many bottom-dwelling (benthic) organisms die, larger, long-lived species are eliminated, and productivity is shifted to non-hypoxic periods (energy pulsing). Effects of hypoxia on fishery resources could include direct mortality of both fish and their food base, as well as such indirect effects as altered migration patterns, reduction in suitable habitats, increased susceptibility to predation and disease, and disruption of spawning and recruitment (CENR, 2000).

## **B. Produced Water Discharges to the Hypoxic Zone**

Produced water is defined as the water (brine) brought up from the hydrocarbon bearing strata during extraction of oil and/or gas and can include formation water, injection water, small volumes of condensed water, and trace amount of treatment chemicals. Produced water is the highest volume waste generated in association with oil and gas production operations. (CAPP, 2001) The amount of produced water from a reservoir varies widely and increases over time as the reservoir is depleted. (NRC, 2003)

EPA has relied on data from the MMS Oil and Gas Accountability Reports database to determine the number of platforms/wells located within and the volume of produced water historically discharged to the hypoxic zone. According to MMS data, 1731 oil and gas wells currently discharge in the area defined as the hypoxic zone. MMS, the Offshore Operators Committee, and EPA jointly agreed on June 9, 2004, that platform/well activities in a defined set of lease blocks are considered to discharge to the hypoxic zone. MMS has provided information to EPA that approximately 180 new oil and gas wells will be completed in the hypoxic zone each year. EPA and MMS estimate that each new well will, on average, discharge 50 barrels of produced water per day. The total annual increase from new wells is estimated to be approximately 3.3 million barrels of produced water.

Potential impacts of produced water discharges are generally related to the exposure of

organisms to concentrations of various chemicals. Factors that affect the amount of produced water constituents and their concentrations in seawater and, therefore, their potential for impact on aquatic organisms, include the following (Georgie et al. 2001):

- dilution of the discharge into the receiving environment;
- instantaneous and long-term precipitation;
- volatilization of low molecular weight hydrocarbons;
- physical-chemical reactions with other chemical species present in seawater that may affect the concentration of produced water components;
- adsorption onto particulate matter; and,
- biodegradation of organic compounds into other simpler compounds.

Within the marine environment, it is necessary to distinguish between shallow, poorly flushed coastal areas and the open ocean. For offshore operations, key factors include concentration of constituents and other characteristics of the constituents such as toxicity, bioavailability, and form. Actual fate and effects vary with volume and composition of the discharge and the hydrologic and physical characteristics of the receiving environment (Rabalais et al. 1992). However, it is important to understand that translating produced water constituents into actual impacts is not a trivial exercise.

In light of heightened concern about the causes and remedies for Gulf hypoxia, EPA has examined the potential for oil and gas extraction discharges to contribute to Gulf hypoxia. EPA has focused its analysis on the oxygen demanding properties of produced water because, as noted above, produced water constitutes the largest volume waste stream from oil and gas extraction activities. EPA Region 6 has not historically required the submission of BOD, TOC, or COD monitoring data from offshore oil and gas operators and has, thus, relied upon MMS for characterization of the oxygen demand of produced waters. MMS has provided BOD data collected from 16 offshore Gulf of Mexico platforms. The analysis yields a mean value of 1007 mg/L for BOD<sub>21</sub> with a Cv of 0.93, indicating a high variability to the data.

In addition to the increase in oxygen demand from new wells completed in the hypoxic zone, the produced water discharges from existing wells are expected to increase until the wells are no longer economical to operate. (DOE, 2004) The long term trend of the number of total wells discharging in the hypoxic zone indicate that on average the number of wells discharging into the hypoxic zones is decreasing by 65 wells per year. Based on this information, EPA and MMS expect that this trend will continue into the foreseeable future. The offset provided by a reduction in the number of wells, in spite of increased discharge volumes from older wells, is anticipated to result in the volume of oxygen demanding pollutants discharged into the hypoxic zone remaining constant or decreasing during the life of the permit.

In 2003, the National Research Council (NRC) of the National Academy of Sciences, issued a report, compiled by a committee of fourteen scientists and engineers, entitled *Oil in the Sea III: Inputs, Fates and Effects*. That report was compiled after MMS approached the Ocean Studies Board to update the previous 1985 report addressing petroleum hydrocarbon discharges to



the marine environment, and after funding was provided by the MMS, the U.S. Geological Survey (USGS), the Department of Energy (DOE), the Environmental Protection Agency, the National Oceanic and Atmospheric Administration (NOAA), the U.S. Coast Guard, the U.S. Navy, the American Petroleum Institute, and the National Ocean Industries Association.

The report estimates that oil and gas extraction activities contributed only about 1.2 percent of the average annual releases (1990-1999) of petroleum hydrocarbons to the North American marine waters. The greatest contributor of petroleum hydrocarbons, about 63 percent, is attributed to natural seeps. However, of the estimated 3 kilotonnes of petroleum hydrocarbon discharged into North American marine waters by oil and gas extraction activities, over 90 percent are from produced water discharges, which release low but continuous amounts of dissolved components and dispersed crude oil. The report suggests that the ecological impact of produced water discharges is not clear and consideration of these impacts should be given for future monitoring programs. Additionally, the report recommends that federal agencies, especially NOAA, MMS, the U.S. Coast Guard and the USGS should work with industry to develop and support a systematic and sustained research effort to further basic understanding of the processes that govern the fate and transport of petroleum hydrocarbon released into the marine environment from a variety of sources. (NRC, 2003).

Although MMS data indicate a trend of reduced discharge of produced water volumes from oil and gas extraction activities over the past several years, increasing emphasis and incentives for domestic production may revise that trend in the future. EPA Region 6 is concerned about the extent to which increases in the volume of produced water discharges, which may occur after the proposed permit term, may impact the Gulf of Mexico.

### **C. Study on the Impact of Produced Water on the Hypoxic Zone of the northern Gulf of Mexico**

#### **DETAILS OF PRODUCED WATER STUDY**

EPA, in coordination with MMS, is proposing to conduct a study to collect additional information to support an evaluation of the potential BOD contribution from produced water discharges in the hypoxic zone located in the northern Gulf of Mexico. Our intent is to ensure that we have the information necessary to determine whether or not anticipated future increases in produced water discharges may result in unreasonable degradation of the marine environment under Clean Water Act Section 403(c). The agencies expect to work closely with the oil and gas industry to conduct this study during the next three years.

EPA and MMS anticipate that additional data will need to be collected on concentration of BOD in produced waters as well as information on certain chemical and physical characteristics of receiving waters in the hypoxic zone. Some of this data may be collected directly by the agencies, and we may also request that some monitoring information be collected at a statistically

determined subset of platforms discharging produced waters in and around the hypoxic zone of the northern Gulf. If information is requested from some operators, we expect that the data will be limited to monthly monitoring of basic parameters such as BOD and ammonia in produced waters and/or a vertical gradient profile measuring parameters such as temperature, salinity, dissolved oxygen, and density in receiving waters adjacent to platforms where produced waters are discharged.

EPA and MMS expect to complete the study design before this proposed permit is issued. The agencies are seeking public comment on this study, including comment on which parameters should be sampled. Additional information on the study is provided below.

#### 1. Study Area:

The study area is likely to include wells located in the following Minerals Management Service defined lease areas: High Island blocks 36, 37, 47, 48, 854, 86, 117, 118, 131, 132, A1, A2, A3, A4, A11, A12, A13, and A14; High Island blocks 35 through A180; Sabine Pass blocks 5 through 16; West Cameron blocks 154 through 356; West Cameron blocks 22 through 276, East Cameron blocks 10 through 190; Vermillion block 10 through 211; South Marsh Island blocks 208 through 287; South Marsh Island blocks 1 through 55; Eugene Island blocks 20 through 245; Ship Shoal blocks 37 through 211; South Pelto blocks 1 through 25; South Timbalier blocks 7 through 182; Grand Isle blocks 16 through 63; and, West Delta blocks 15 through 101 .

#### 2. Effluent Characterization:

EPA, in coordination with MMS, is proposing to collect information in order to better quantify the oxygen demand loading from produced water discharges. The agencies expect to collect data and may also seek monitoring information from some operators discharging produced waters in the hypoxic zone, regarding parameters such as BOD, Ammonia and Total Organic Carbon. EPA is seeking public comment on this testing and which parameters should be included.

#### 3. Near Field Testing:

EPA, in coordination with MMS, is proposing to collect information regarding certain chemical and physical characteristics of receiving waters adjacent to wells discharging produced waters in the hypoxic zone of the northern Gulf of Mexico. Parameters measured by the agencies may include a vertical profile through the water column of depth, temperature, conductivity, density, salinity, and dissolved oxygen. The agencies may conduct sampling, and/or seek monitoring information from some operators currently discharging produced waters in the hypoxic zone. EPA is seeking public comment on this testing and which parameters should be included.

#### 4. Post-Study Follow-up:

Should EPA determine as a result of this study that increases in the discharge of produced water will cause unreasonable degradation of the marine environment, EPA and MMS will coordinate to

evaluate what next steps are appropriate to effectively address this issue.

## **VIII. Changes from the Expiring Permit**

### **A. Produced Water Oil and Grease Monitoring**

The expiring permit requires operators to collect and analyze a produced water sample for compliance with the oil and grease limits when a sheen is observed as a result of the discharge. Those monitoring requirements are proposed to be revised to better describe the time-frame during which samples are required to be collected and the type of sample. Operators have the option of collecting either a grab sample or several samples for a composite. In either case, sampling must be commenced within two hours after a sheen is observed.

### **B. Areas of Biological Concern**

The Flower Garden Banks has been defined to be an area of biological concern by the general permit and discharges have been prohibited at the location since 1984. That area coincides, in part, with the “no activity zone” which was established by the Minerals Management Service. In 1992 the area was designated as the Flower Garden Banks National Marine Sanctuary by the National Oceanographic and Atmospheric Administration (NOAA). Its present boundaries were established in 1993 and encompass an area which is slightly larger than the no activity zone. The general permit’s prohibition of discharges in areas of biological concern was expanded slightly in 1993 to include the Flower Garden Banks National Marine Sanctuary.

Based on information obtained as the result of an EPA enforcement action and discussions with NOAA, it has been determined that the permit could authorize some discharges to the National Marine Sanctuary which are presently prohibited. The NOAA regulations (15 CFR Part 922, Subpart L) allow some discharges incidental to oil and gas activities, from facilities which predate designation of the sanctuary and which are located outside the no activity zone. In order to more accurately reflect the regulations governing the National Marine Sanctuary and authorize those discharges which are consistent with Federal regulations, the permit’s existing prohibition is proposed to be relaxed slightly and include the following language:

There shall be no discharge in Areas of Biological Concern and National Marine Sanctuaries. The Flower Garden Banks has been determined to be a National Marine Sanctuary and is within the geographical area covered under this permit.

[Exception] Facilities located within a National Marine Sanctuary boundary are authorized to discharge in accordance with this permit if all of the following conditions are met:

- The platform was installed prior to the designation of the National Marine Sanctuary;

- The platform is located outside of the No Activity Zone defined by the Minerals Management Service;
- All materials are discharged through a shunt pipe that terminates within 10 meters of the sea floor;
- Sanitary waste is treated with an approved marine sanitation devise (MSD) that complies with pollution control standards and regulations under section 312 of the Clean Water Act;

and

- The materials discharged are associated with and incidental to oil and gas exploration, development, or production and originate from wells located within the boundaries of the National Marine Sanctuary and outside the No Activity Zone.

The requirement that all discharges are made within ten meters of the sea floor and that sanitary waste water discharges are treated in a Coast Guard approved marine sanitation devise were established by NOAA to prevent migration of pollutants and bacteria which could harm the coral reefs located in the marine sanctuary. It should be noted that the requirements for sanitary waste water are also consistent with section 312 of the Clean Water Act.

Regulations, including 15 CFR Part 922.122(3)(ii), prohibit the discharge of material into the marine sanctuary which originates from activities conducted outside its boundaries. That prohibition includes produced water from wells located outside the marine sanctuary which could, at some future date, be separated from oil or gas at a platform located within the sanctuary boundaries. That potential new produced water discharge is not proposed to be authorized inside the National Marine Sanctuary boundaries. Any produced water from wells located outside the sanctuary will need to be disposed of by an alternative means or at an alternative location.

Based on information obtained from NOAA, the discharges which are proposed to be authorized will be consistent with the National Marine Sanctuary regulations including 15 CFR Part 922. Although the changes to the permit conditions are based on the National Marine Sanctuary regulations and not on available scientific literature, studies which have been conducted under the auspices of the Minerals Management Service support the need to restrict the discharges which are being proposed to be authorized. Research activities have found that historic oil and gas activities have impacted the resources of the Flower Garden Banks National Marine Sanctuary (Kennicutt, 1995). In addition, the permit requirements are consistent with stipulations which NOAA has included in its recent authorization of a Minerals Management Service pipeline permit (FGBNMS-2003-009). Recent correspondence from industry representatives to the marine sanctuary manager (Jerrell, October 7, 2003 and October 10, 2003) suggest that operator of the one platform presently located in the sanctuary is capable of complying with the requirements. The correspondence lists actual methods which will be incorporated to attain compliance. EPA has discussed the permit requirements at length with the sole permittee which will be affected.

While the permittee does not support any new regulation which would be applied, it has stated that there are no practical considerations which would make compliance with the permit requirements infeasible. The permittee also stated that it would be technically infeasible to discharge produced water into the marine sanctuary from a new well located six miles outside its boundaries (ROC October 30, 2003). Therefore, EPA believes the new permit authorization is reasonable and consistent with applicable Federal regulations.

### **C. Notification and Reporting Requirements**

The expiring permit requires that operators submit notices of intent to be covered fourteen days prior to commencing discharge. EPA has determined no administrative reason to require operators to submit a notice of intent fourteen days prior to discharging. The fourteen day advanced notification requirement is proposed to be removed from the permit. Notifications of intent to be covered by the permit will be required to be submitted only prior to discharge. A minimum time limit will no longer be required.

In addition, minor changes are proposed in the permit's language to resolve questions regarding requirements for operators to apply for a subsequent, reissued permit. Operators who have requested coverage and are authorized to discharge under the general permit are not required to re-apply for coverage under a subsequent permit. Coverage is automatically continued until terminated by either the permittee or EPA. Allowances to that effect were included in the permit as a part of the 1998 reissuance. Minor changes in wording are again proposed to better clarify the permit's notification requirements.

Industry groups have developed alternative discharge monitoring report forms for use in expediting their reporting under the permit. To ensure consistency with the permit's requirements, the permit is proposed to require approval of forms by EPA's Enforcement Division prior to use. Since some of the permit's requirements are expected to change with this reissuance, any forms used under the previous permit must again be reviewed by Enforcement.

A change in the requirements for a notice of termination is also proposed. There has been some confusion by operators submitting a notice of termination regarding when the final discharge monitoring report is due. The proposed permit requires that the final discharge monitoring report is submitted to EPA along with the notice of termination. Since the notice of termination submission is required within sixty days after permanent termination of discharges from a facility, operators should have sufficient time to collect any data needed for the final discharge monitoring report.

### **D. Measurement of Cadmium and Mercury in Stock Barite**

The expiring permit does not specify an analytical method for the measurement of cadmium and mercury in barite used in drilling fluids. When no alternate test method is specified permittees are required to use approved methods listed in 40 CFR Part 136. However, since barite is a solid and the methods listed in part 136 are for pollutants in water, an alternative method is

appropriate. EPA methods 245.5 and 7471 have been determined to be more appropriate for the measurement of cadmium and mercury in stock barite; therefore, the permit as proposed requires the use of methods 245.5 and 7471.

**E. Option to Use Gas Chromatography/Mass Spectrometry to Measure Formation Oil Contamination**

Operators are required to monitor discharges of synthetic based drilling fluids adhering to drill cuttings for contamination with formation oil, once per week, using a reverse phase extraction test method. Due to the higher accuracy of the Gas Chromatography/Mass Spectrometry (GC/MS) test method, some operators have requested the option of using that method instead of the reverse phase extraction method. EPA believes that the GC/MS method is more accurate; however, the method was not required in the previous permit because it is more expensive and not widely available offshore. The reissued permit is proposed to allow operators the option of using either test method.

**F. Produced Water Toxicity Limitations**

At the request of industry representatives, several minor changes in the permit's requirements for produced water toxicity testing are proposed. The changes are intended to offer operators additional flexibility in actions taken to meet the produced water toxicity limitations.

The proposed permit specifies that operators may make operational changes, such as shutting in wells, to reduce the produced water discharge rate and decrease the critical dilution required to be met for the toxicity limits. Although the permit in no way controls production and does not require operators to take actions such as shutting in wells, the language is included in the proposed permit, as requested, to make it clear to all permittees that such options are available.

For new discharges, the expiring permit requires operators to determine the produced water critical dilution based on the highest discharge rate in the preceding twelve months. The time frame for determining the discharge rate is proposed to be reduced from twelve months to three months, to be consistent with the permit's requirements that monitoring commence the first calendar quarter after discharge has begun.

The expiring permit includes several stipulations requiring operators to calculate their critical dilution, using the CORMIX model, when adding a horizontal diffuser or when their produced water discharge rate exceeds 75,000 bbl/day. The permit stipulates that operators use version 3.20 or newer of the model. Due to industry concerns that the permit could be inferred to require operators to use the newest version of the model available, the verbiage is proposed to be changed to clearly show that permittees have the option of using newer versions of the CORMIX model.

Several minor language changes are also proposed to show that the annual toxicity monitoring cycle corresponds to the reporting period for the discharge monitoring report.

## **G. New Miscellaneous Discharges**

The permit is proposed to contain several changes intended to better characterize some relatively minor discharges related to offshore operations, especially in deep water. These include blowout preventer fluid, sub-sea production control fluid, leak tracer fluid, umbilical steel tube storage fluid, and wellhead preservation fluid. Many of the fluids are non-toxic hydraulic fluids which are discharged in minute amounts due to impurities which temporarily interfere with proper seating of valves and as a result of the valve construction which is required to endure extremely high sub-sea pressure. Some fluids, such as wellhead preservation fluid are injected into the sub-sea wellhead by a remotely operated vehicle to prevent corrosion or to prevent the vents from freezing and may be discharged in amounts up to fifteen gallons. Although these are somewhat insignificant discharges, the no free oil limits which apply to other miscellaneous discharges is not sufficient to meet Ocean Discharge Criteria and prevent the discharge of toxic pollutants to the marine environment. Since many of these discharges will be made in water depths greater than 5,000 feet, free oil which is discharged at the seafloor is unlikely to be adequately measured by observing for a sheen on the receiving water surface. Therefore, a toxicity limit on the fluids prior to their use is included in the permit. Based on available data a toxicity limit of 400 mg/l is proposed. Toxicity testing will be required on the fluids once per year prior to use. Testing will be accomplished using a 96-hour chronic test with the *Mycidopsis bahia* and *Menidia beryllina* species. While the limits are more stringent than those presently required by European countries for discharges in the North Sea, the proposed water column testing is significantly less sensitive than the tests required in Europe. It is believed that this will be a comparable permit requirement. Additionally, the *Mycid* and *Menidia* tests have existing standard protocols which are well established in NPDES permits. The limit will prevent the use of more toxic fluids while not significantly limiting the products which are still authorized to be discharged.

The permit also proposes to differentiate the limits for miscellaneous discharges to which a dye has been added for leak detection from other miscellaneous discharges to which treatment chemicals have been added. The existing requirements for chemically treated sea water and fresh water were included in the permit to control the toxicity of discharges to which toxic treatment chemicals, such as biocides, have been added. Many of those discharges, like hydrostatic test water, are discharged in high volumes and fit the category of chemically treated miscellaneous discharges. The proposed permit more explicitly explains that minor discharges containing dyes fall under the general miscellaneous discharges category and the limits for chemically treated waste water do not apply.

## **H. Variability Factors for Drill Cuttings Sediment Toxicity and Biodegradation Limitations**

The existing permit was modified in 2001 to authorize the discharge of drill cutting associated with wells drilled using non-aqueous drilling fluids (including synthetic based drilling fluids). New limits for sediment toxicity and biodegradation were included in the permit as a part of that modification. The limits, which are required by National Effluent Limitations Guidelines (40 CFR Part 435, Subpart A), were based on newly established test methods. To ensure a

smooth transition with the new test methods, EPA Region 6 modified the calculation method for demonstrating compliance with these newly established technology-based sediment toxicity and biodegradation limitations and standards.

Since the time of the 2001 permit modification, laboratories have gained experience performing the new tests. Refinements have also been made in the available base fluids used in synthetic based drilling fluids so that there is presently much more reliability that a particular fluid will comply with the limits. Therefore, it appears that industry has fully adapted to the new technology-based sediment toxicity and biodegradation limitations and standards. Thus the modified calculation method for demonstrating compliance with these newly established technology-based sediment toxicity and biodegradation limitations and standards (i.e., the “variability factor”) is proposed to be removed from the reissued permit.

Recent communications with EPA's Office of Wastewater Management and Office of Science and Technology have also supported removal of the variability factor (Boornazian and Smith, 2003). When the effluent limitations guidelines governing discharges associated with synthetic based drilling fluids (40 CFR Part 435, Subpart A) were issued the available technologies and alternatives were explored at length. EPA identified SBFs (and blends of SBF) with an environmental performance (e.g., sediment toxicity and biodegradation limitations and standards) equal to or better than pure  $C_{16}$ - $C_{18}$  internal olefin as technically and economically achievable. EPA identified that operators should use product substitution (either complete product substitution or through the blending of better environmentally performing synthetic base fluids such as low viscosity esters and vegetable esters) to comply with the SBF technology-based sediment toxicity and biodegradation limitations and standards (e.g., 40 CFR 435.13, Footnotes 6, 7, & 8). The technology-based limitations and standards for sediment toxicity and biodegradation call for deterministic comparisons, with an absolute upper limit. Modifying the calculation method (e.g., “use of a variability factor”) is not consistent with the required deterministic approach identified in the effluent guidelines. There is some concern that use of a variability factor sufficiently weakens the limit established in the guidelines so that other, less desirable base fluids such as paraffins could be used in a blend and pass the tests. Additionally, recent industry data clearly demonstrates that operators can have superior technical drilling performance and readily comply with the technology-based sediment toxicity and biodegradation limitations and standards without the need for any modifications. Therefore the variability factor is proposed to be removed from the reissued permit.

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